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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,296	01/10/2002	Chris D. Constantinides	56783	6836

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EXAMINER	
CHAO, ELMER M	
ART UNIT	**PAPER NUMBER**
3737	

MAIL DATE	DELIVERY MODE
05/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

NF

Office Action Summary	Application No.	Applicant(s)	
	10/044,296	CONSTANTINIDES, CHRIS D.	
	Examiner	Art Unit	
	Elmer Chao	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3, 6-25, 27, and 37-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-25,27 and 37-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Acknowledgement is made of Applicant's amendment filed 4/17/2007.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/17/2007 has been entered.

Response to Arguments

3. Applicant's arguments filed 4/17/2007 have been fully considered but they are not persuasive.

4. Regarding Applicant's arguments with respect to claims 1-7, 9, 12-22, 24, and 37-39, Applicant argues the obviousness of the combination of the '121 reference and the '112 reference. Examiner directs Applicant's attention to the Office Action filed 11/2/2006, pages 2-3, where Examiner has stated:

> Weissleder '814, Ranney '762, and newly introduced reference Berg et al. (U.S. 5,128,121) all provide motivation for using contrast agents to enhance MRI imaging. Weissleder '814 and Berg '121 additionally teach the use of an iron oxide contrast agent for cardiac MRI imaging. Berg '121 also teaches the differentiation of signals of specific tissues through the use of negative and positive contrast agents for enhancing MRI imaging. Furthermore, it is well-known to a person of ordinary skill in the art that MRI imaging is based directly upon differences of signal intensities from different types of tissue, so the idea of

> maximizing and minimizing signal intensities of the different types of tissues to be detected is a very well-known principle for MRI imaging, especially coupled to the problem of better identifying infarcted tissue as disclosed by Judd '112.

Examiner asserts that the combination Judd '112 and Berg '121 would be clearly obvious to one skilled in the art because an iron oxide contrast agent is a well-known means for improving contrast during MRI imaging (for motivation see Berg '121, C1, L10-26).

5. Regarding Applicant's arguments with respect to claims 8, 10-11, 23, 25, and 27, Applicant's attention is directed to the above response with respect to claims 1-7, 9, 12-22, 24, and 37-39.

6. Regarding Applicant's arguments with respect to claims 1-7, 9, 12-22, 24, 37-39, Applicant argues that the cited references do not teach the limitation of providing contrast between the ventricular cavity and infarcted myocardial tissue. Examiner has provided a new grounds of rejection to overcome the argument.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 1-3, 6, 7, 9, 12-22, 24, 37-39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Judd et al. (U.S. 5,910,112) in view of Berg et al. (U.S. 5,128,121), further in view of Foo (U.S. 2002/0087067).

Judd '112 teaches a method of evaluating biological tissue by imaging it with ^{23}Na or ^{39}K magnetic resonance and a magnetic resonance system for ^{23}Na or ^{39}K MRI, where the tissue is cardiac tissue, where a study is made of the subject's heart and the cardiac tissue is identified as normal, injured or infarcted, where the subject has or had a cardiac or cardiovascular disorder, and manipulating echo time (TE) so as to assist in identifying infarcted myocardial tissue (C1, L15-18; C3, L32-37 & 46-53; C4, L12-30; C22, L43-67; C23, L1-23; C3, L2-5).

Judd '112 does not expressly teach the use of an iron oxide contrast agent so as to attenuate the ^{23}Na or ^{39}K MRI signal for ventricular cavity blood and viable well-perfused tissue. However, Berg '121 teaches a method of improving the contrast in MRI images by using a ferromagnetic or paramagnetic contrast agent such as an iron oxide bound to a polysaccharide (C2, L26-35) to decrease the signal level of the targeted tissue relative to its surroundings (C1, L10-38). It would have been obvious to a person having ordinary skill in the art to modify Judd '112 to include the use of iron oxide to attenuate the ^{23}Na or ^{39}K MRI signal for ventricular cavity blood and viable well-perfused tissue. Such a modification would enable an enhanced image contrast (C1, L10-26) so as to better distinguish viable and non-viable cardiac tissue, a criticality already established by Judd '112.

Judd '112 and Berg '121 do not explicitly teach providing a contrast between the ventricular cavity and infarcted myocardial tissue. However, in the field of myocardial infarction detection, Foo '067 teaches the method of providing a contrast between the ventricular cavity and infarcted tissue (Para [0036]). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Judd '112 in view of Berg '121 to also provide contrast between the ventricular cavity and infarcted myocardial tissue in order to improve delineation of infarcted myocardium from ventricular blood pool and normal myocardium (for motivation see abstract; Para [0014]-[0015]).

9. **Claims 8, 10-11, 23, 25, 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Judd '112 in view of Berg '121, further in view of Foo '067, further in view of Weissleder (U.S. 5,492,814). Judd '112, Berg '121, and Foo '067 teach all of the limitations as discussed above. Judd '112, Berg '121, and Foo '067 do not expressly teach the use of an iron oxide contrast agent with one or more iron atoms coordinated with a polymer having oxygen substitution, and with a dextran. However, Weissleder '814 teaches an iron oxide contrast agent for use in MRI, where the tissue imaged may be damaged heart tissue, such as infarcted myocardium, where the contrast agent has one or more iron atoms coordinated with a polymer having oxygen substitution, with a dextran and where the contrast agent is in a pharmaceutically acceptable form (C1, L16-24 & L41-55; C3, L1-11 & 28-36; C5, L7-16 & L50-63; C16, L61-67; C17, L1-12). Therefore, it would have been obvious to one of ordinary skill in

the art at the time of the invention to have used the iron oxide contrast agent from Weissleder to enhance the visualization in the images of Judd '112 because the use of contrast agents in MRI to improve quality as previously shown by Berg '121, and further shown by Ranney (U.S. 5,336, 762) (C7, L48-61). Although neither Judd '112 nor Weissleder '814 nor Berg '121 nor Foo '067 specifically teach the use of MION-46, Weissleder '814 does teach the use of a variety of MION formulas that include dextran, of which MION-46 would have been an obvious choice to one of ordinary skill in the art.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elmer Chao whose telephone number is (571)272-0674. The examiner can normally be reached on 9am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EC
5/10/2007

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